Transforming the NextGen Test Environment:
Integrating Fused ADS-B and TIS-B NextGen Data

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Purpose

This goal of this project is to develop a prototype capability to read and store the Exelis commercial Internet-based NextGen fused data stream to support ongoing NextGen and Unmanned Aircraft System (UAS) integration into the National Airspace System (NAS) Project research efforts across the Agency. This data set contains detailed information on participating instrument flight rules (IFR), visual flight rules (VFR), and airport ground movement, providing a more complete and accurate set of air traffic information than is currently available to NASA. Access to more realistic and robust air traffic data within the NAS modeling and simulation environment enables the researcher to generate more credible results.

Background

The NASA Ames Research Center currently relies upon Center-TRACON Automation System (CTAS) data feeds (low fidelity primary and secondary radar data) to calculate 4D-trajectories, perform analysis, and generate realistic traffic data to support its simulations. These feeds are limited to state and flight plan data only for aircraft that are IFR and VFR requesting flight services. NASA research is increasingly focused on the study of manned and unmanned aircraft integration throughout the entire NAS, operating in the NextGen environment. Obtaining access to ADS-B/TIS-B data for non-participating aircraft operating under VFR has become a critical element for assessing pivotal see/sense-and-avoid issues, an area normally not assessed during manned aircraft studies. Access to commercially available fused traffic information with representative location accuracy, data conformity, and data rates will improve the fidelity of the NextGen and UAS test environment. Integrating a realistic and reliable NextGen data source is critical to NASA research.

The Exelis NextGen data is developed by processing NAS surveillance data from radars, multilateration systems and ADS-B through multi-sensor trackers. The fused tracks and flight plans from Host Air Traffic Management Data Distribution System (HADDS) are filtered and sent through a one-way diode across the SCAP boundary into the commercial

DMZ. The filtered data stream is merged with Aircraft Situational Display to Industry (ASDI) data, and undergoes fusion processes to correlate flight plans to tracks, eliminate duplicates and populate with metadata from HADDS and ASDI. The result is an integrated track for each flight in the NAS with real-time updating. To summarize, Exelis' NextGen data is a "multi-sensor based" solution that aggregates all available data sources, including: FAA terminal and en route radars FAA ASDE-X systems Exelis' national ADS-B system Flight plan data ASDI data. Benefits of incorporating NextGen data include:

- Fused multi-sensor surveillance – failure of one surveillance source does not mean a complete loss of data
- Geo-referenced data – all surveillance sources are calibrated after fusion to provide more accurate positions.
- As more aircraft become ADS-B equipped, the surveillance accuracy and update rates will improve, as will the quality of the data: the nationwide installation of over 700 ground stations will be completed by 2014.
- Real-time data is publicly available and not subject to FAA MOA requirements